EXPERIENCES IN HIGHER EDUCATION WITH SOS

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Indiana University

RESEARCH TECHNOLOGIES
INDIANA UNIVERSITY
University Information Technology Services

PERVASIVE TECHNOLOGY INSTITUTE
INDIANA UNIVERSITY

OVERVIEW

1. About us
2. How we use SOS
3. Challenges with using SOS
4. Overview of SOS projects
5. Highlights of specific SOS projects

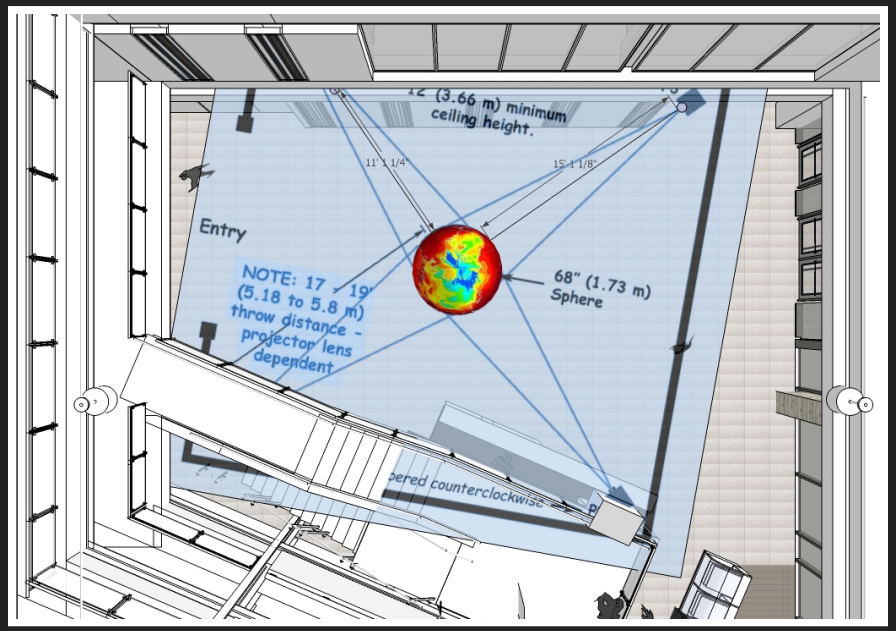
IU ADVANCED VISUALIZATION LAB

"promote the innovative application of visual technologies to advance Indiana University's missions in ***research****,* ***education****,* ***creative activity****, and* ***community outreach****."*

WHY SOS AT IU?

- Put state university in global context
- Students from 49 states and 165 foreign nations enrolled in 2014
- 70+ foreign languages
- International networks: ACE, TransPAC, etc
- School of Global and International Studies

SOS IN THE CIB



SOS IN THE CIB

- Suspended from ceiling in large, open lobby
- Staff on hand experienced with unique displays
- Runs passively throughout the day, but can be reserved for events

HOW IS THE SOS USED AT IU?

- Building tours
- Class support: School of Fine Arts, Science Olympiad
- Special events: SOS Week, SOS After Dark
- Signage during non-SOS events

SOS Week with Ingo Günther

Figure 1. Visitors gather at the "SOS After Dark" outreach event. The event started at 8:30pm which offered prime viewing of the projected Sphere with no incoming sunlight and featured a variety of visualizations on the Science on a Sphere display, the IQ-Wall, and Gunther's WorldProcessor exhibit.

CHALLENGES WITH SOS AT IU

CHALLENGE

Physical location: lobby with glass walls, lots of light

RESPONSE

- Keep lobby lighting low
- Draw shades on sunny days
- Schedule SOS-centric events after sunset

CHALLENGE

Many researchers don't have global data

- US only ~2% of Earth
- Indiana only ~1% of US

RESPONSE

- Embrace it!
- Repeat relevant sections
  - See Vincent Keller's talk on the SOS Splitter tool
  - Thursday 2pm Theater Lobby

CHALLENGE

Most interest comes from outside the scientific disciplines

RESPONSE

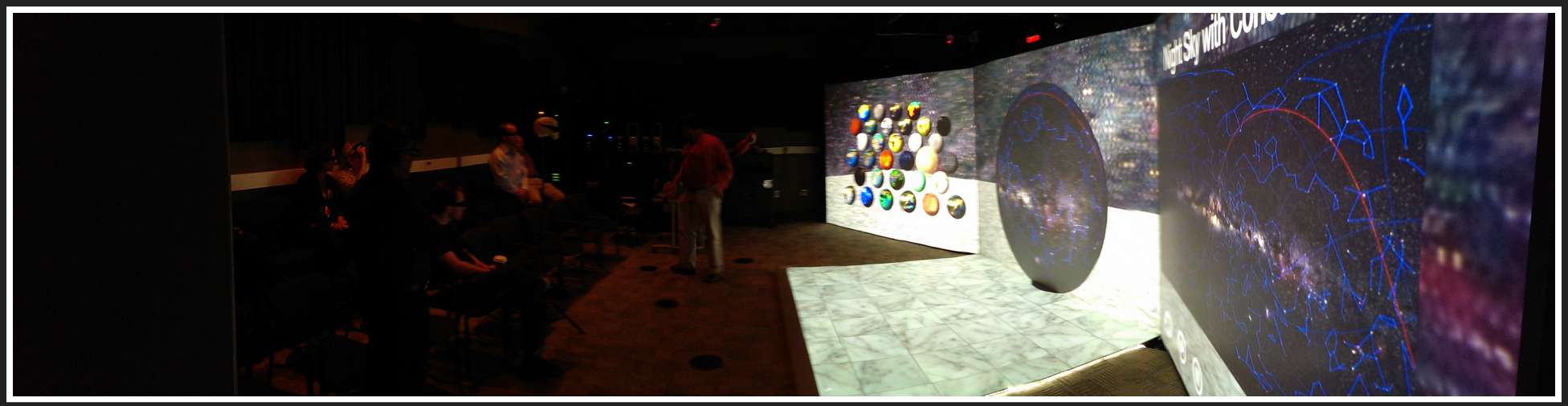
- Embrace it!
- Develop new techniques
- Create our own datasets

OVERVIEW OF SOS PROJECTS

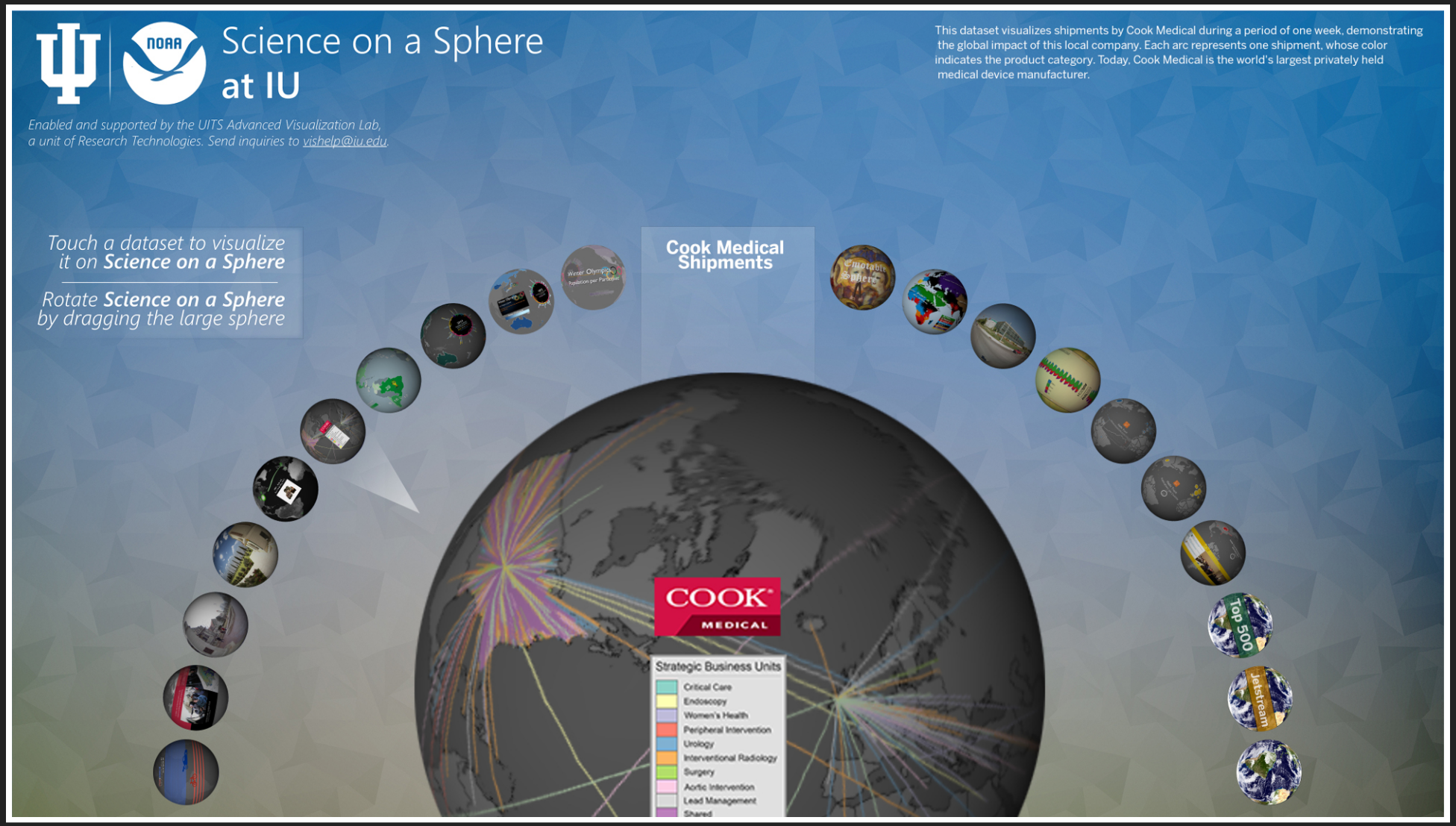
- Non-Dataset, SOS related Projects
- Datasets

X3D Emulator

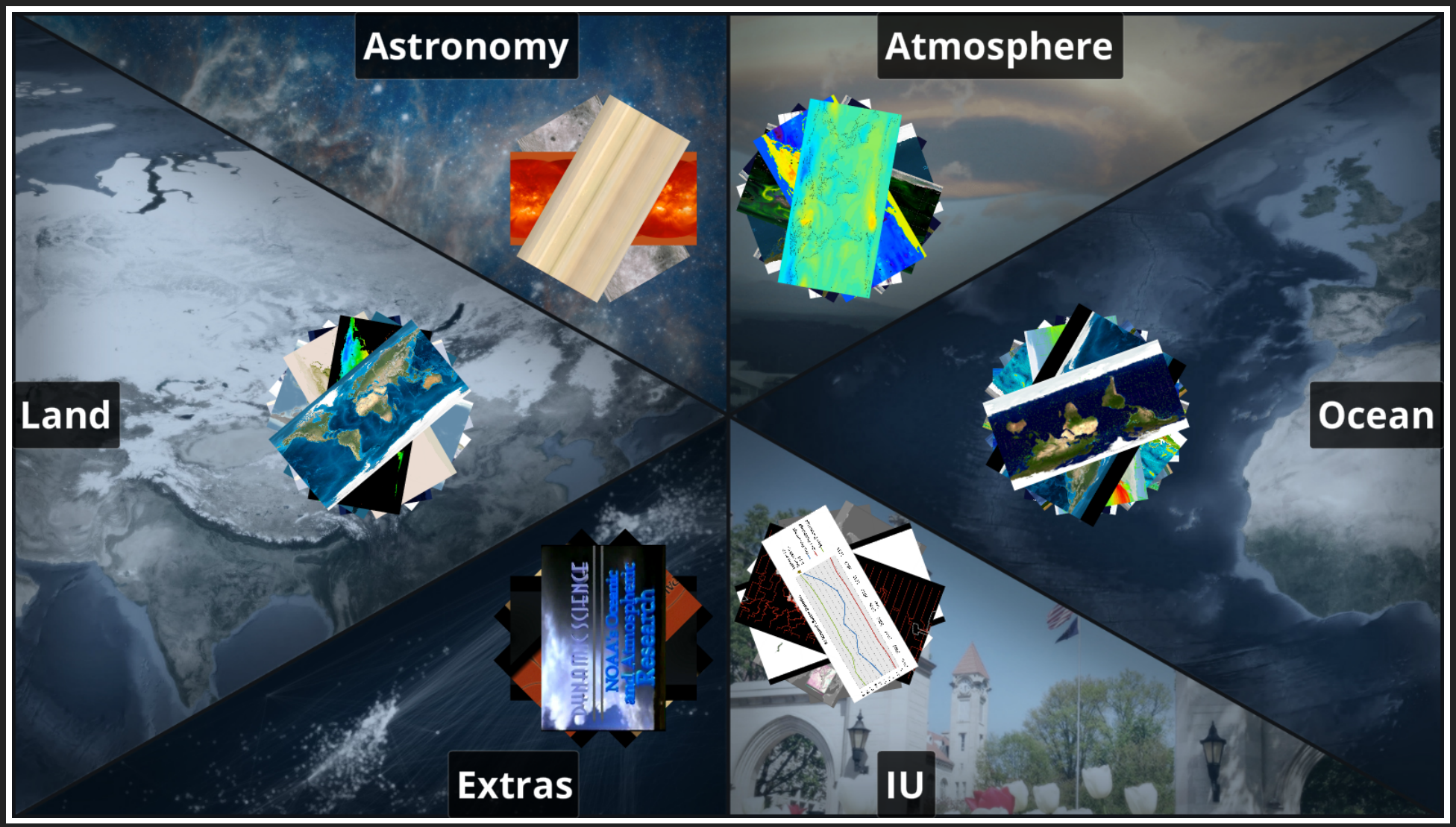
X3D Virtual Reality Emulator



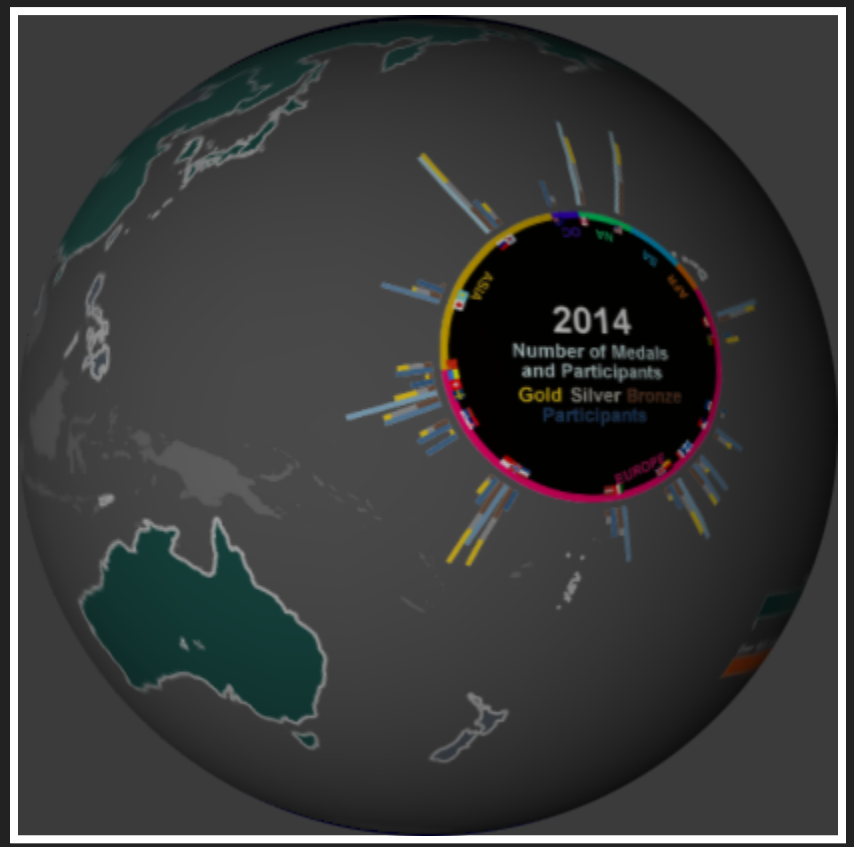
Single User Kiosk



Multi User Kiosk

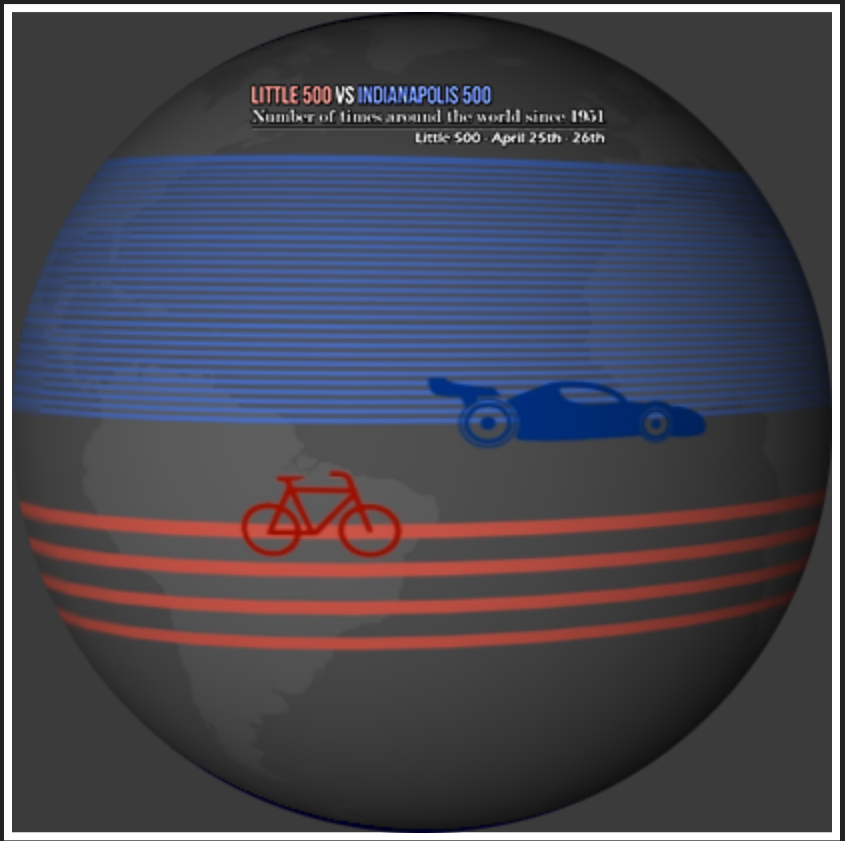


Winter Olympics & World Cup



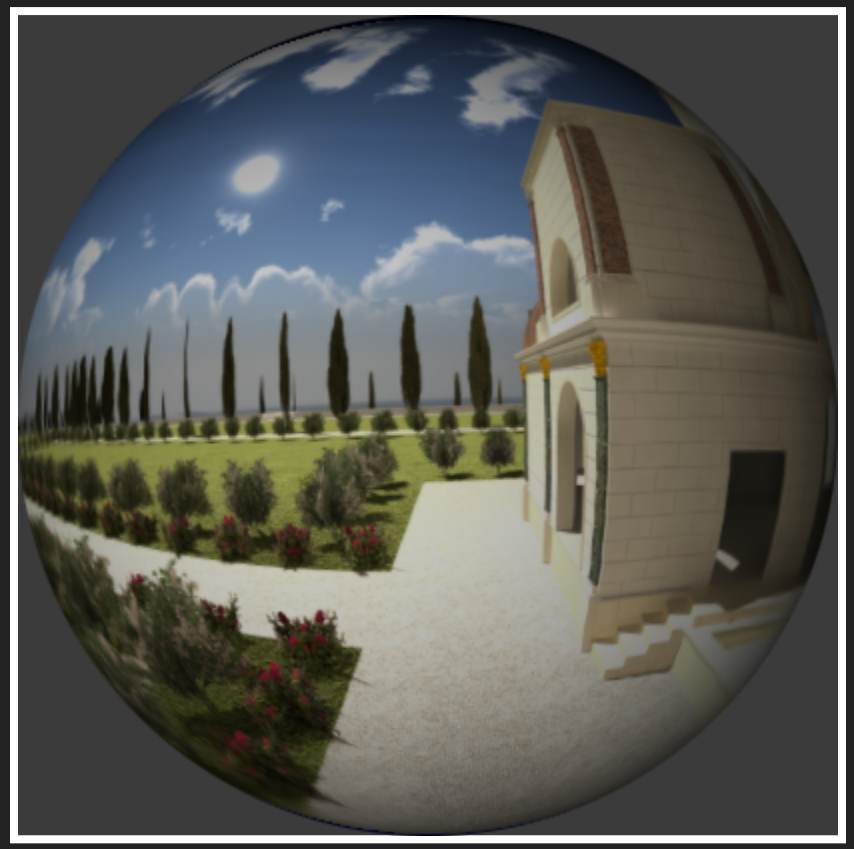
Local & IU Data

Digital Signage



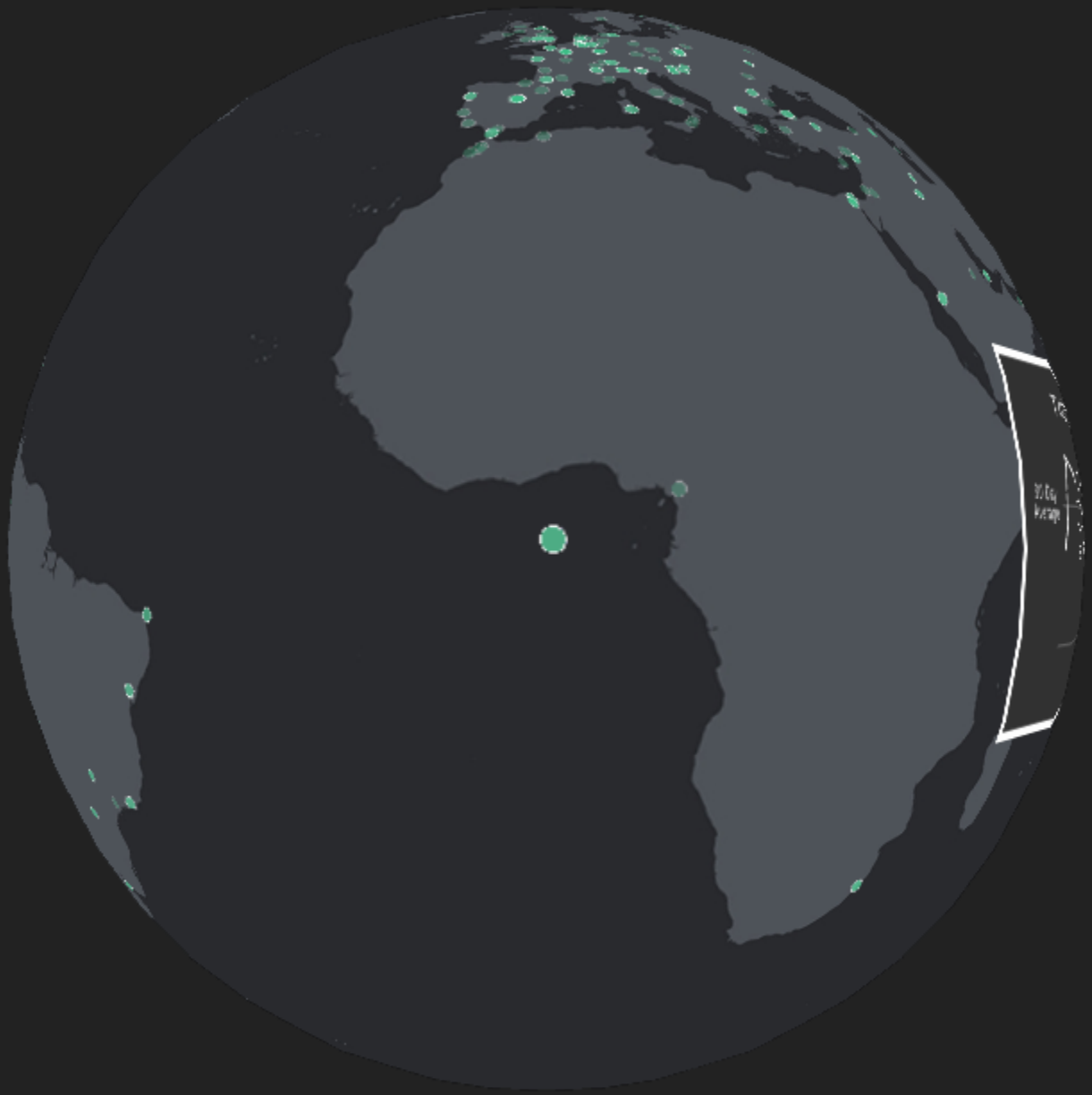
PowerPoint & 360 Panoramas

3D environment render & Artist exhibits

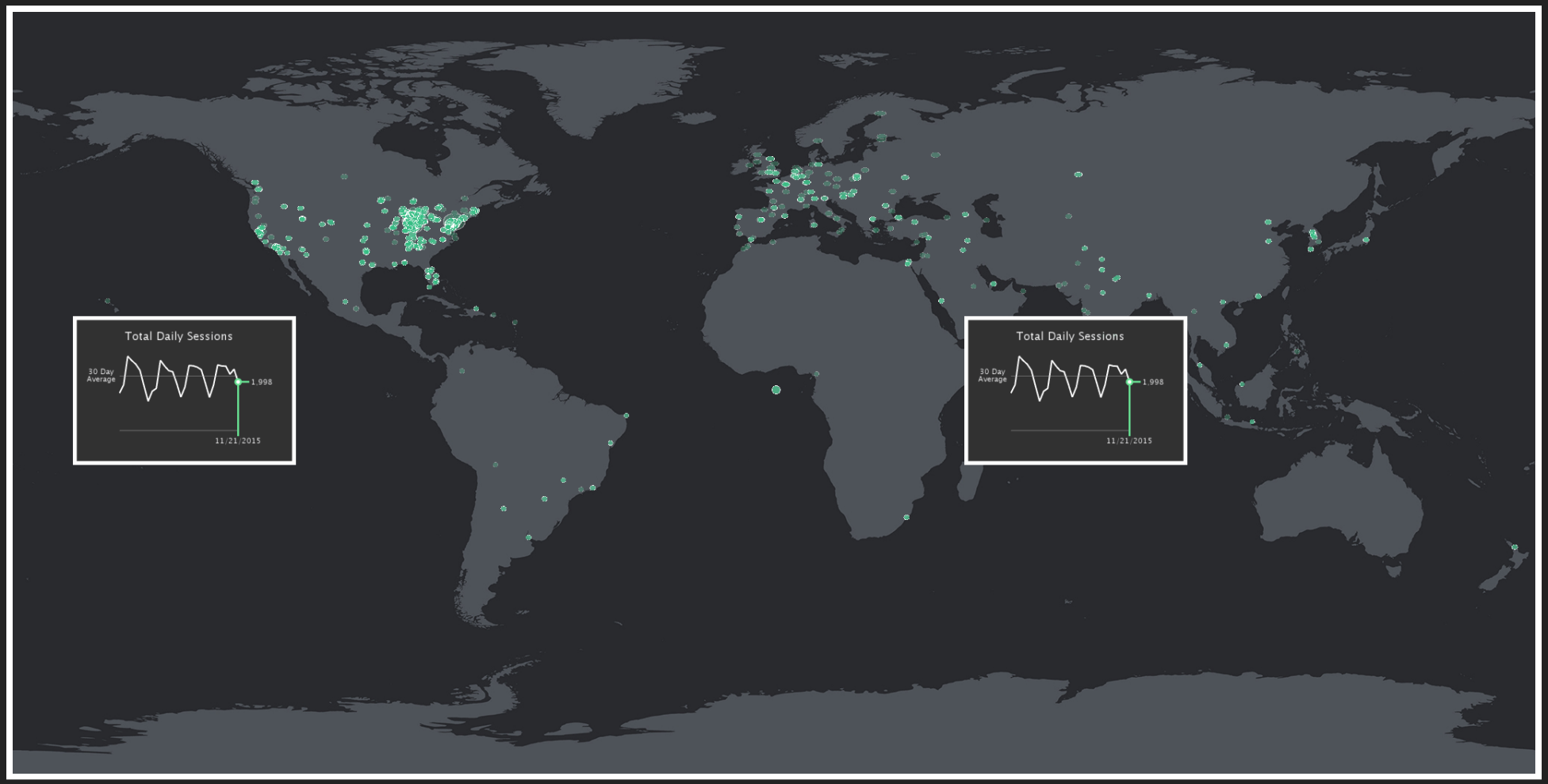


GOOGLE ANALYTICS

Daily Google analytics session & location data

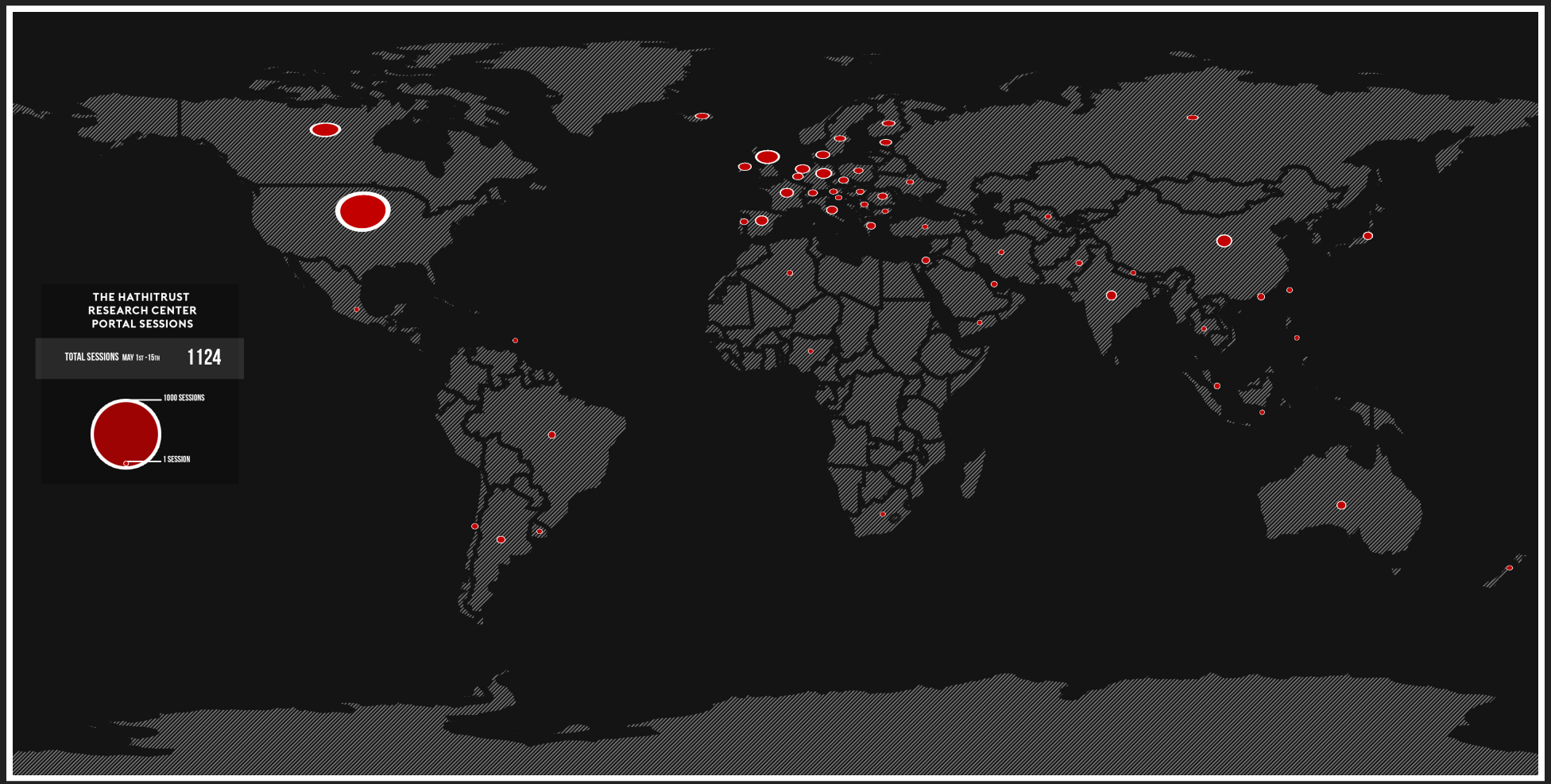


Individual Latitude and Longitude data



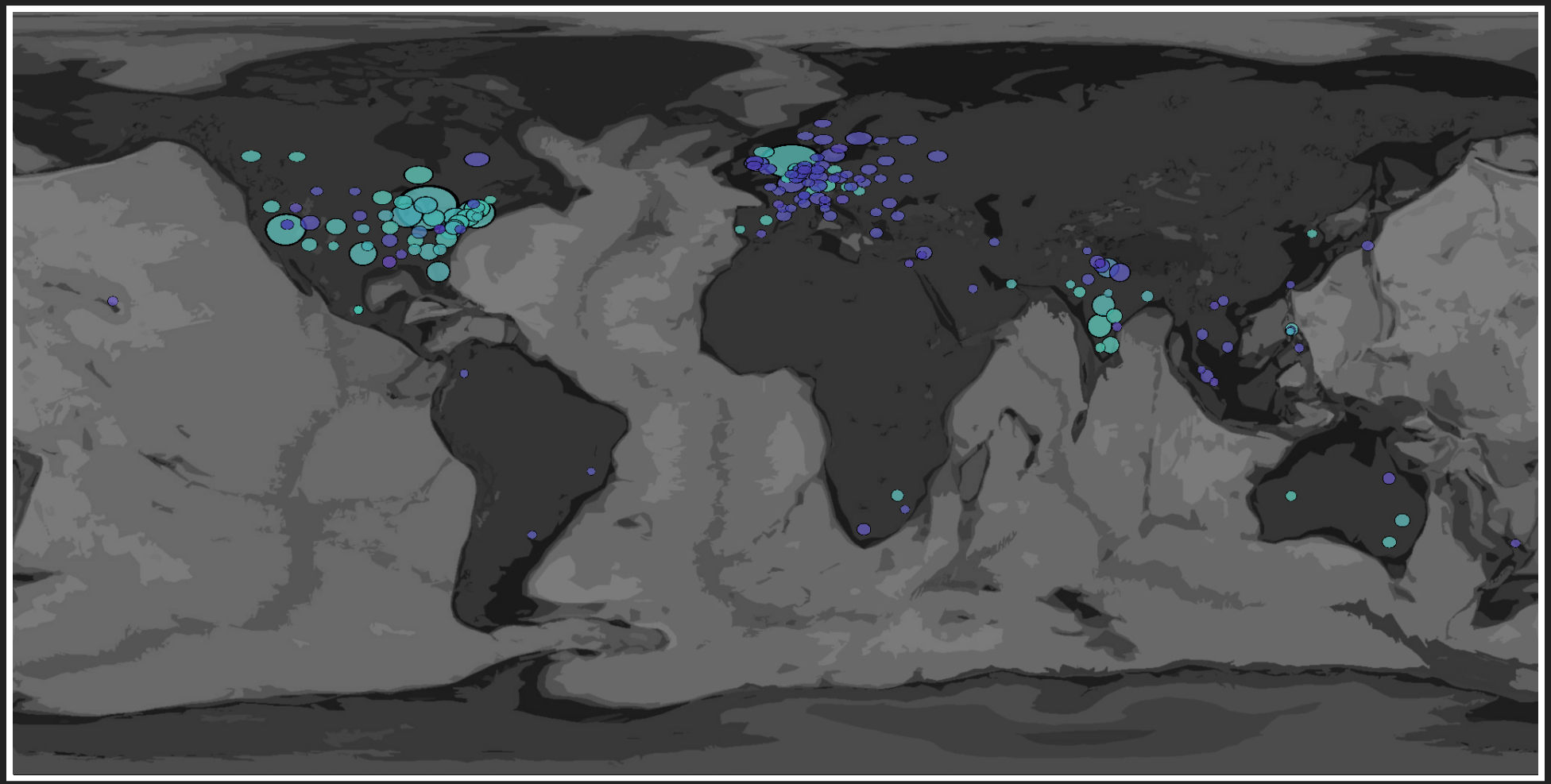
IUware - Student Accessed Site

Session data by region



HTRC Research Portal Site

Mixing Device Types



Desktop vs. Tablet use - IU Knowledge Base

GOOGLE ANALYTICS

- Requirements
  1. Access to data
  2. Clean Data - API
  3. Visualization - Processing

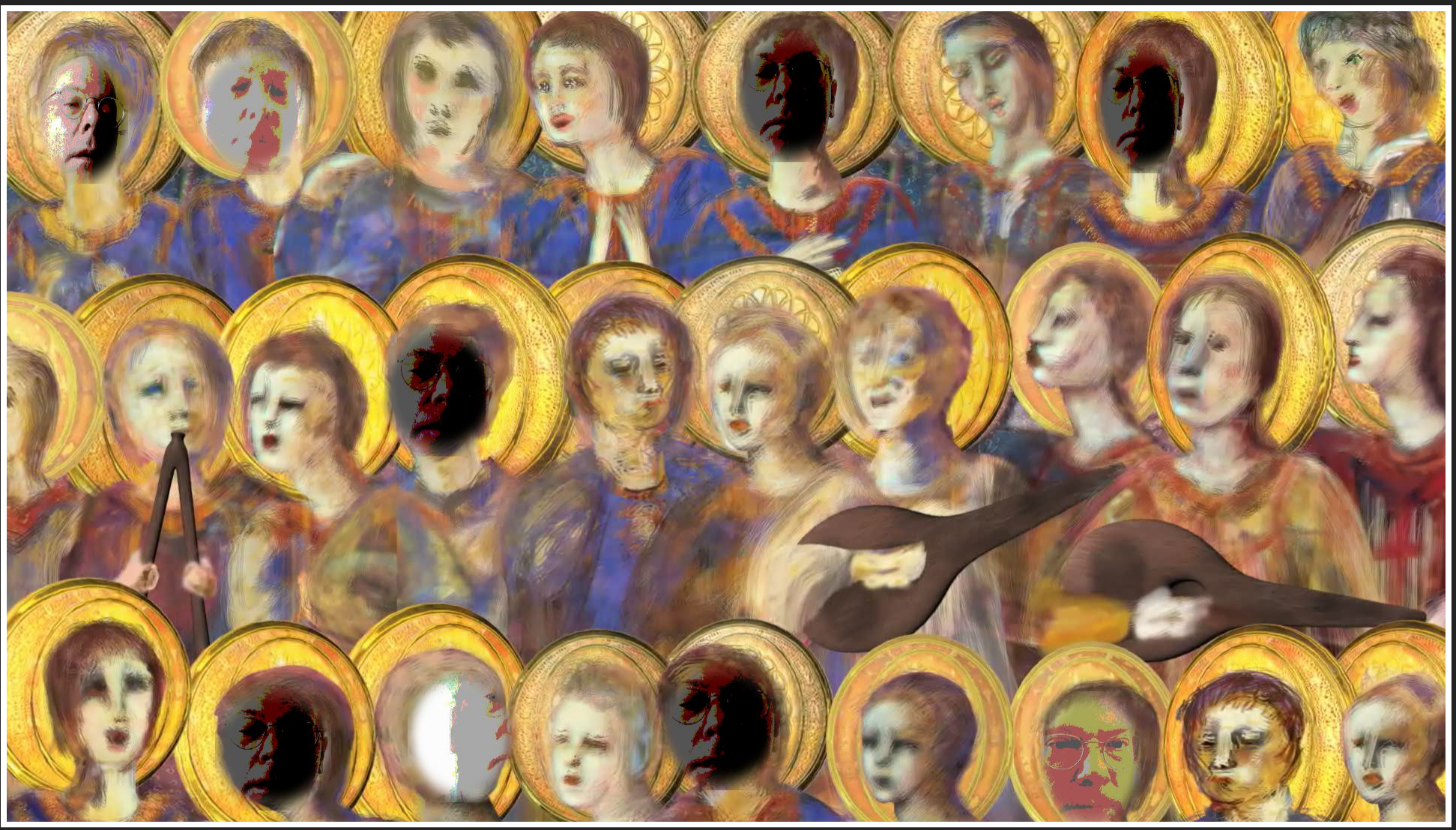
GOOGLE ANALYTICS

- Modular Workflow

1. Daily scheduled shell script runs
2. Calls google API script and retrieves data - examples available through google
3. Data saved into .CSV File
4. Processing Script takes data and generates Visualization
5. Shell script manages labeling images correctly and transfering to SOS

EMOTABLE SPHERE

SOS Version of Margaret Dolinsky's art project Emotable Portraits



EMOTABLE SPHERE

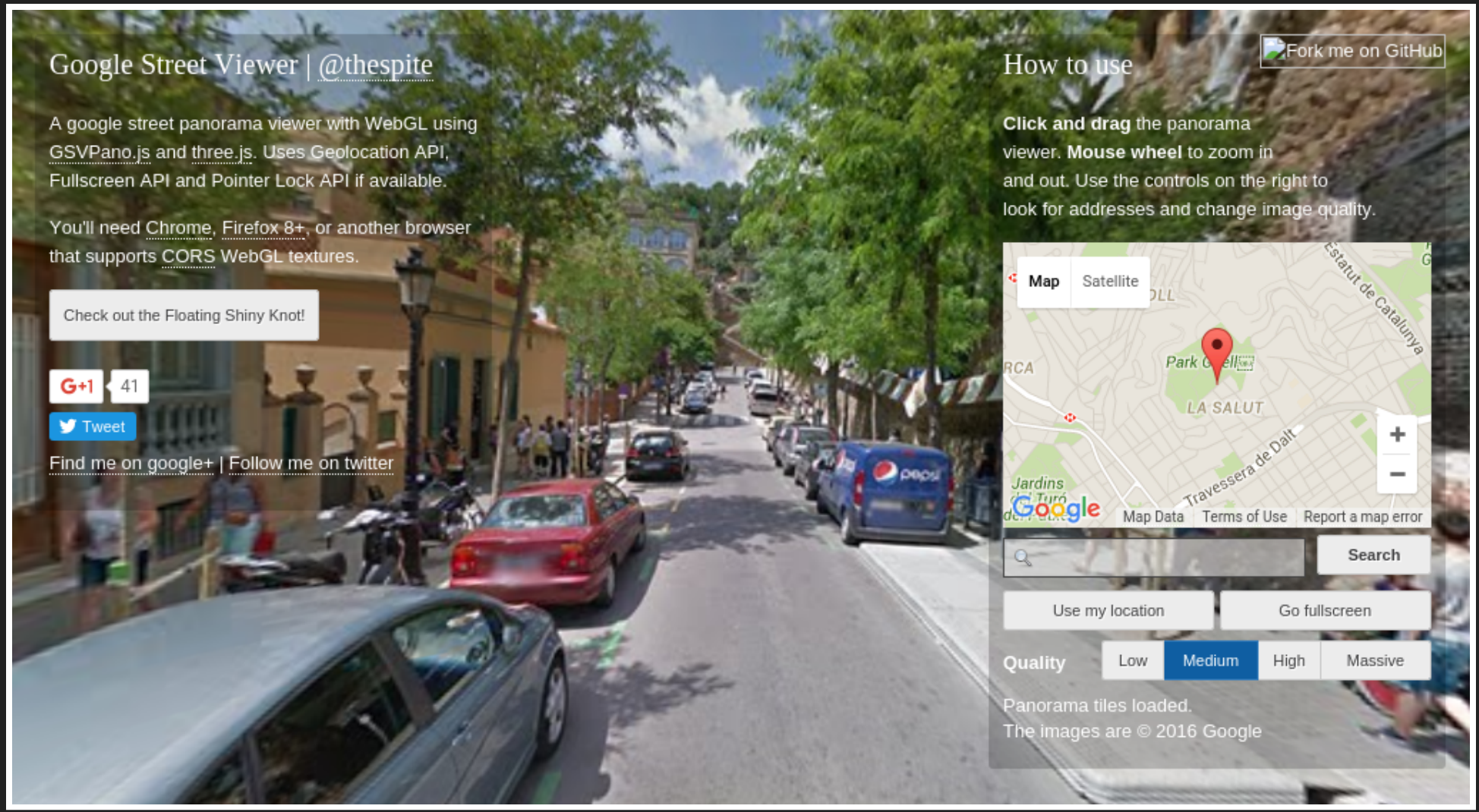
- MaxMSP used to create and modify real time webcam video and export as image sequence
- Image Sequence transfered to SOS(FTP/SSH)
- Modified music visualization script created by Scott Muller that loads images onto SOS
- Did not account for distortion

GOOGLE STREET VIEW

STREET VIEW PANORAMAS FOR SOS

STREET VIEW WORKFLOW

1. User navigates to site, enters address
2. Site fetches panorama from Google Maps API
3. Site sends image data to server on SOS host
4. Server saves panorama in SOS format, updates playlist



Google Street Viewer

https://www.clicktorelease.com/code/street/

Client

```
var canvas = mesh.material.uniforms.map.value.image;
var data = canvas.toDataURL();
...
myhttp.send(data);
```

Server

```
var data = address.replace(/^undefineddata:image\/\w+;base64/, "");
var buf = new Buffer(data, 'base64');
fs.writeFile('/home/sos/image1.png', buf);
```


SR 45 / 50th St
SR 45/46

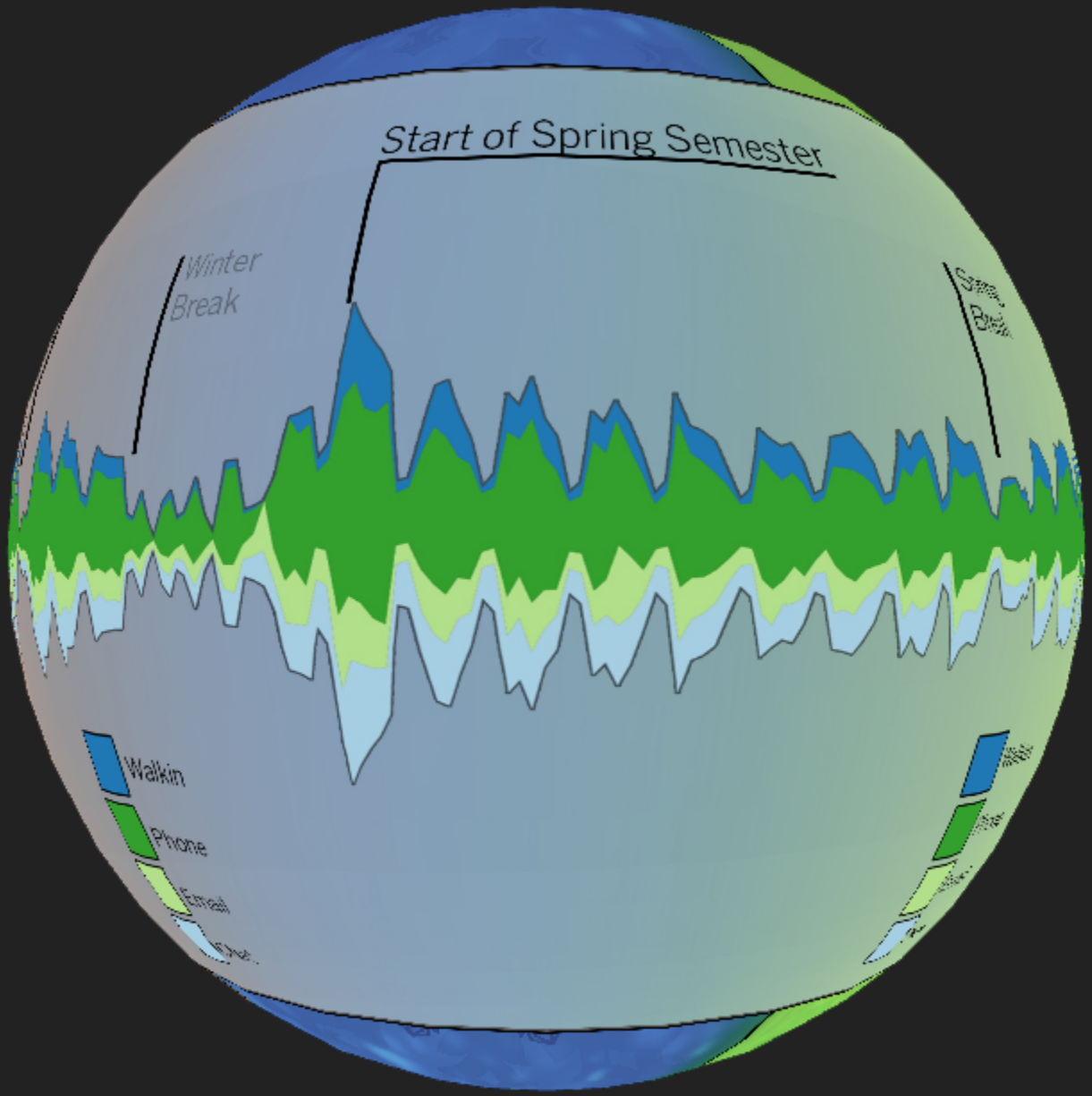
D3 ON A SPHERE

A WORKFLOW FOR USING D3.JS WITH SOS

1. Use D3 to generate SVG in the browser
2. Use SVG Crowbar to save SVG to a file
3. Use graphics editor to clean up, add annotations, etc
4. Create playlist on SOS

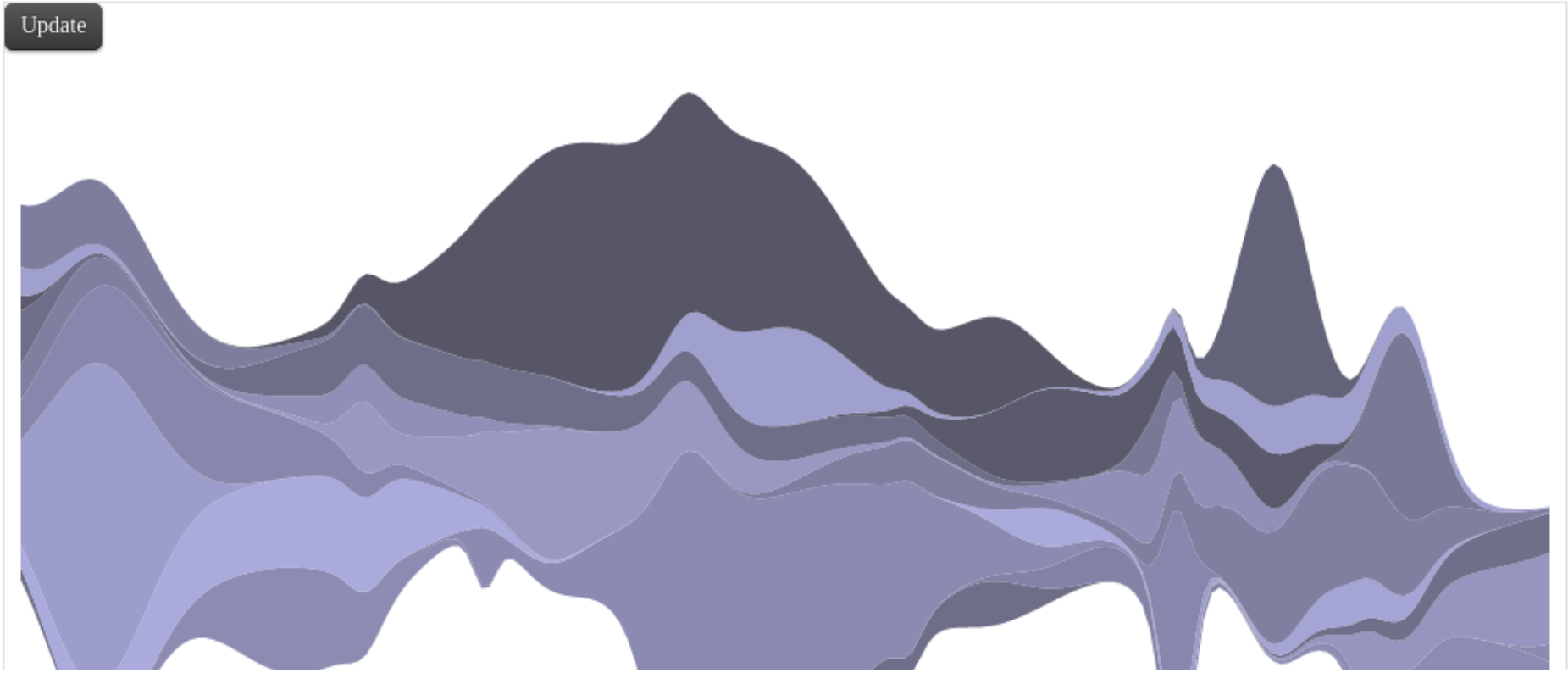
STREAMGRAPH FOR TIME SERIES

- Stacked bar chart wrapped around the equator
- Categories appear as colored *streams*
- Popularized by Last.FM listening histories


Start of Spring Semester
Winter Break
Walkin
Phone

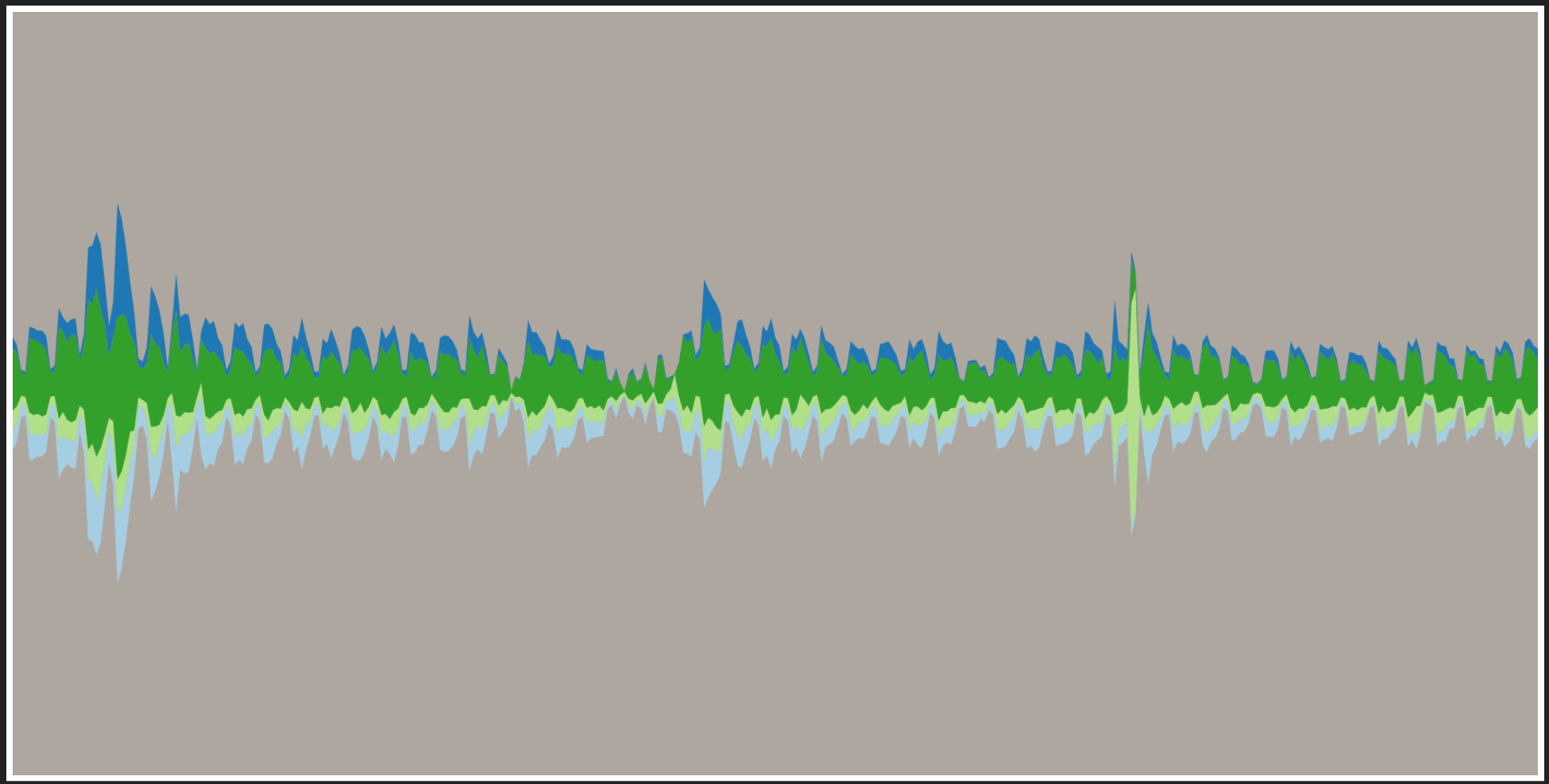
lgrammel's block #1935509 February 28, 2012

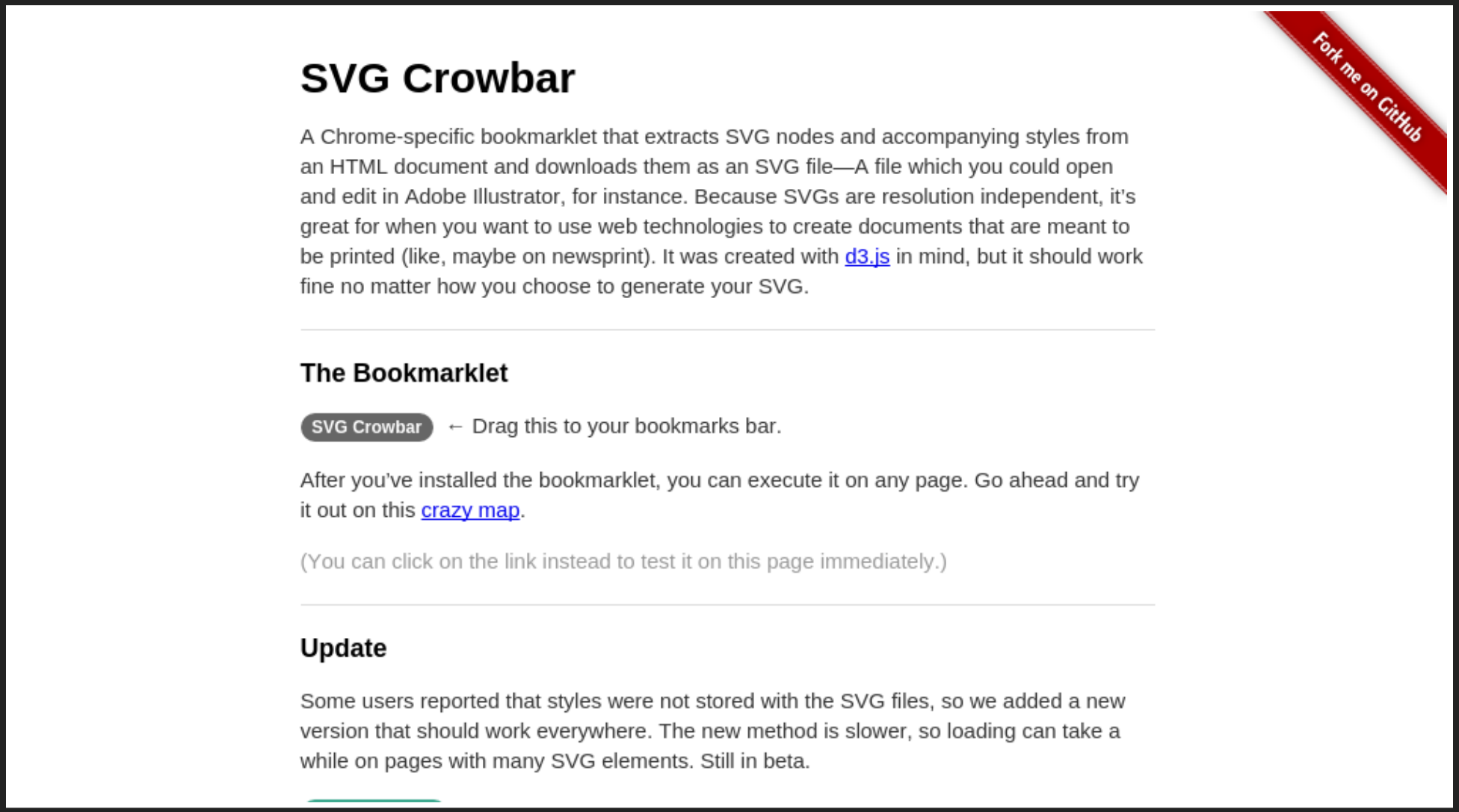
Streamgraph Chart



D3 streamgraph example

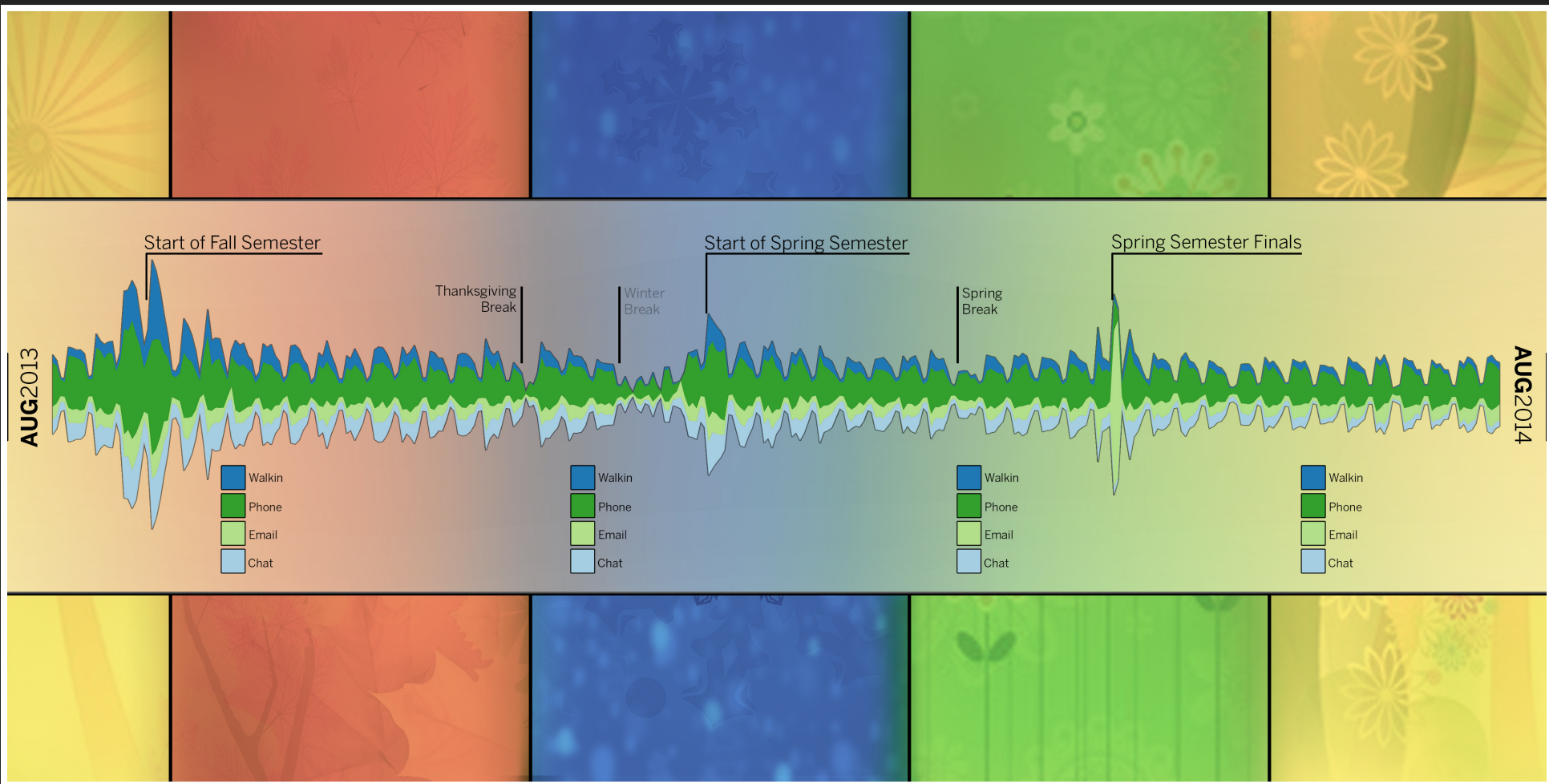
http://bl.ocks.org/lgrammel/1935509





NYT SVG Crowbar

https://nytimes.github.io/svg-crowbar/


Start of Fall Semester
Thanksgiving Break
Winter Break
Start of Spring Semester
Spring Break
Spring Semester Finals
AUG2013
AUG2014
Walkin
Phone
Email
Chat
Walkin
Phone
Email
Chat
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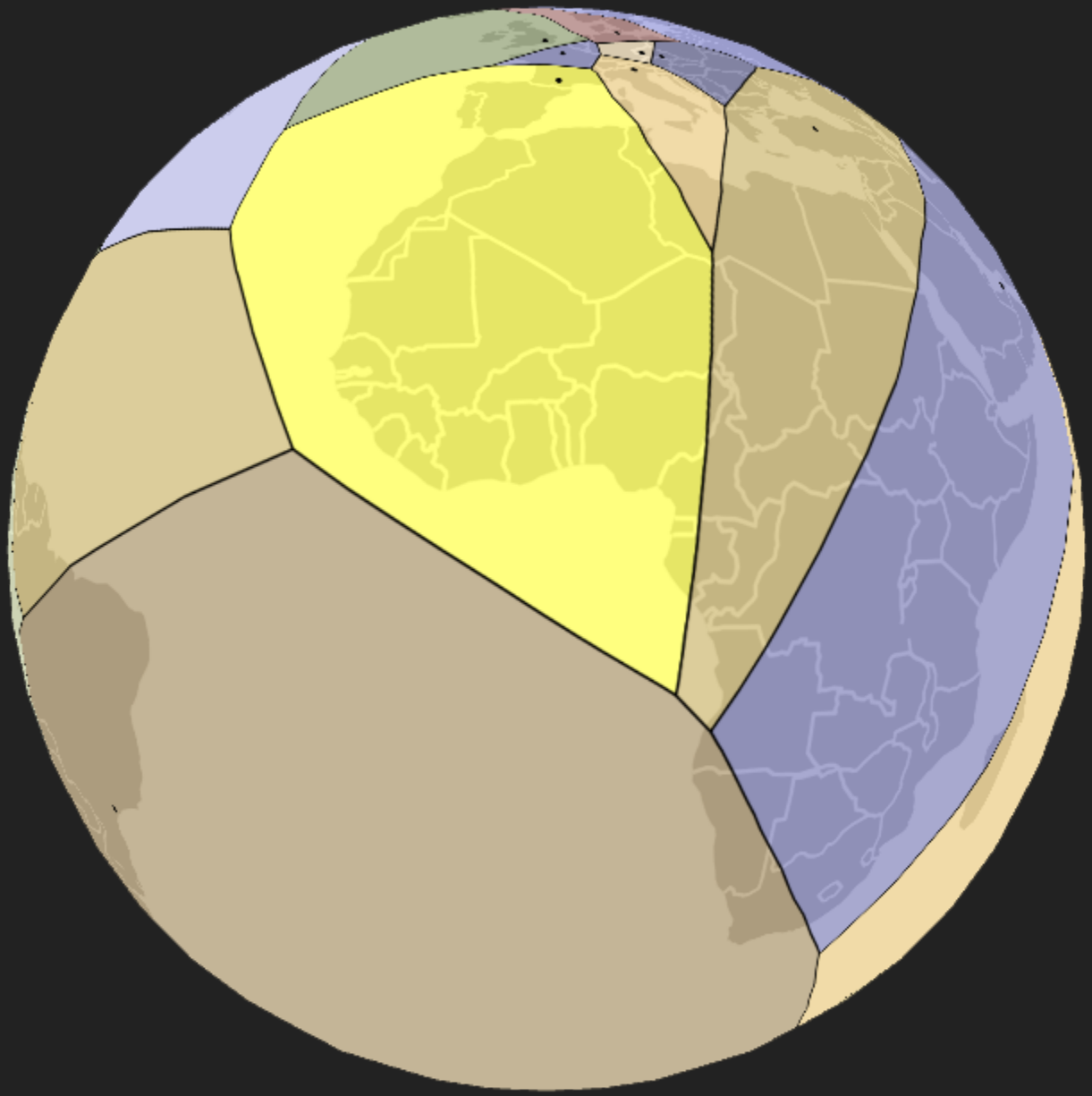
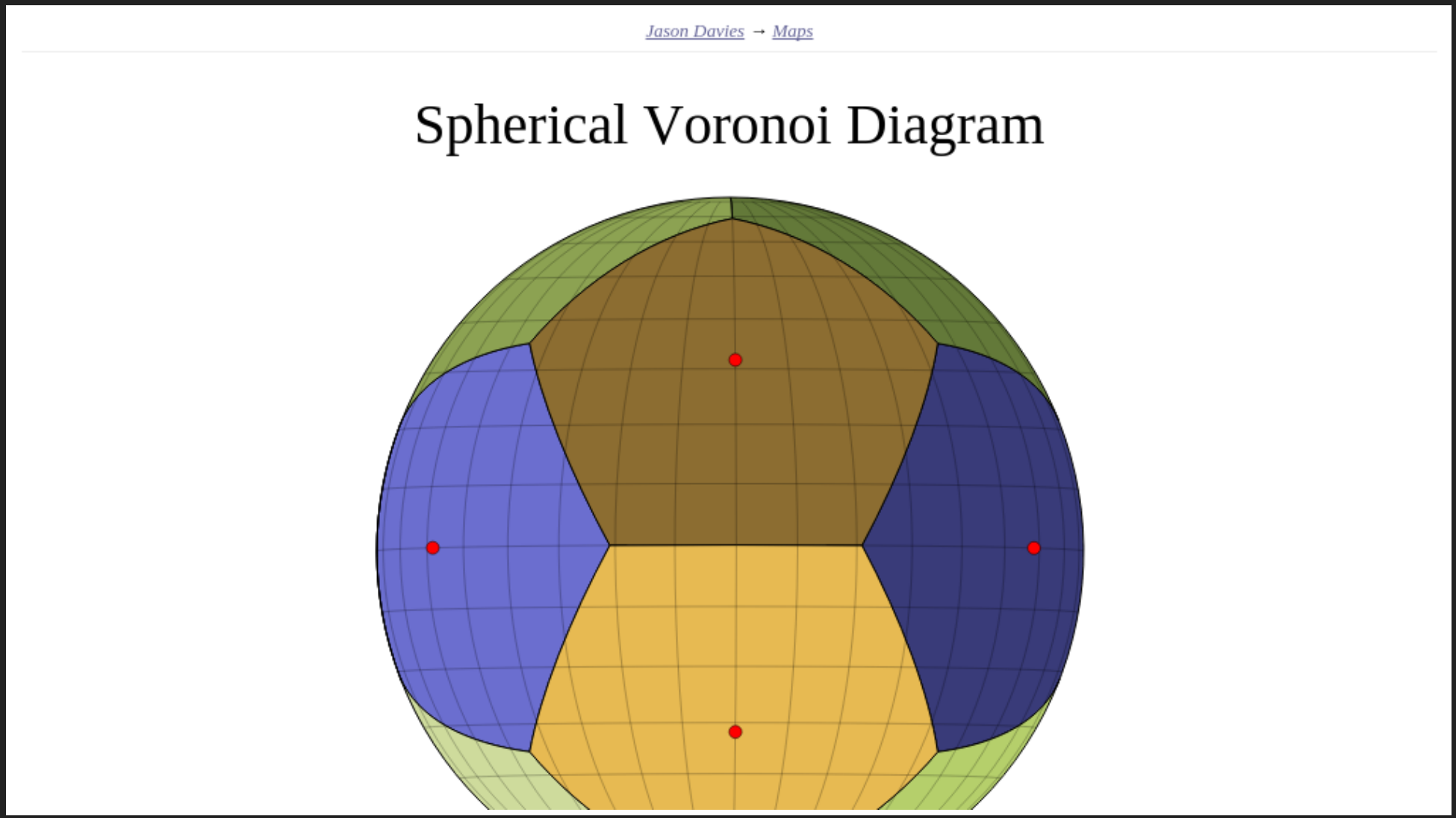
Email
Chat

VORONOI DIAGRAM

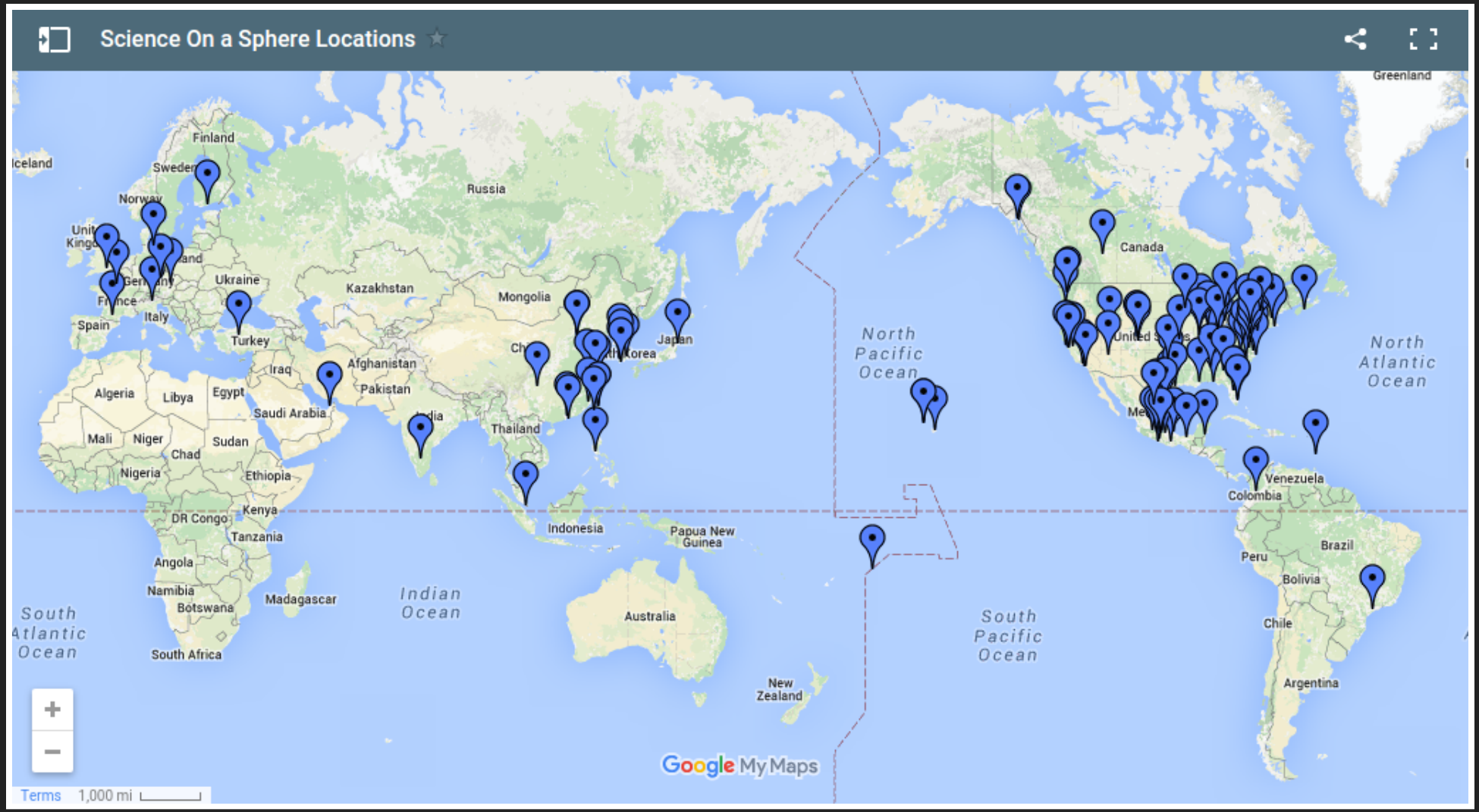
1. Specify set of points
2. Calculate regions which are closest to each point





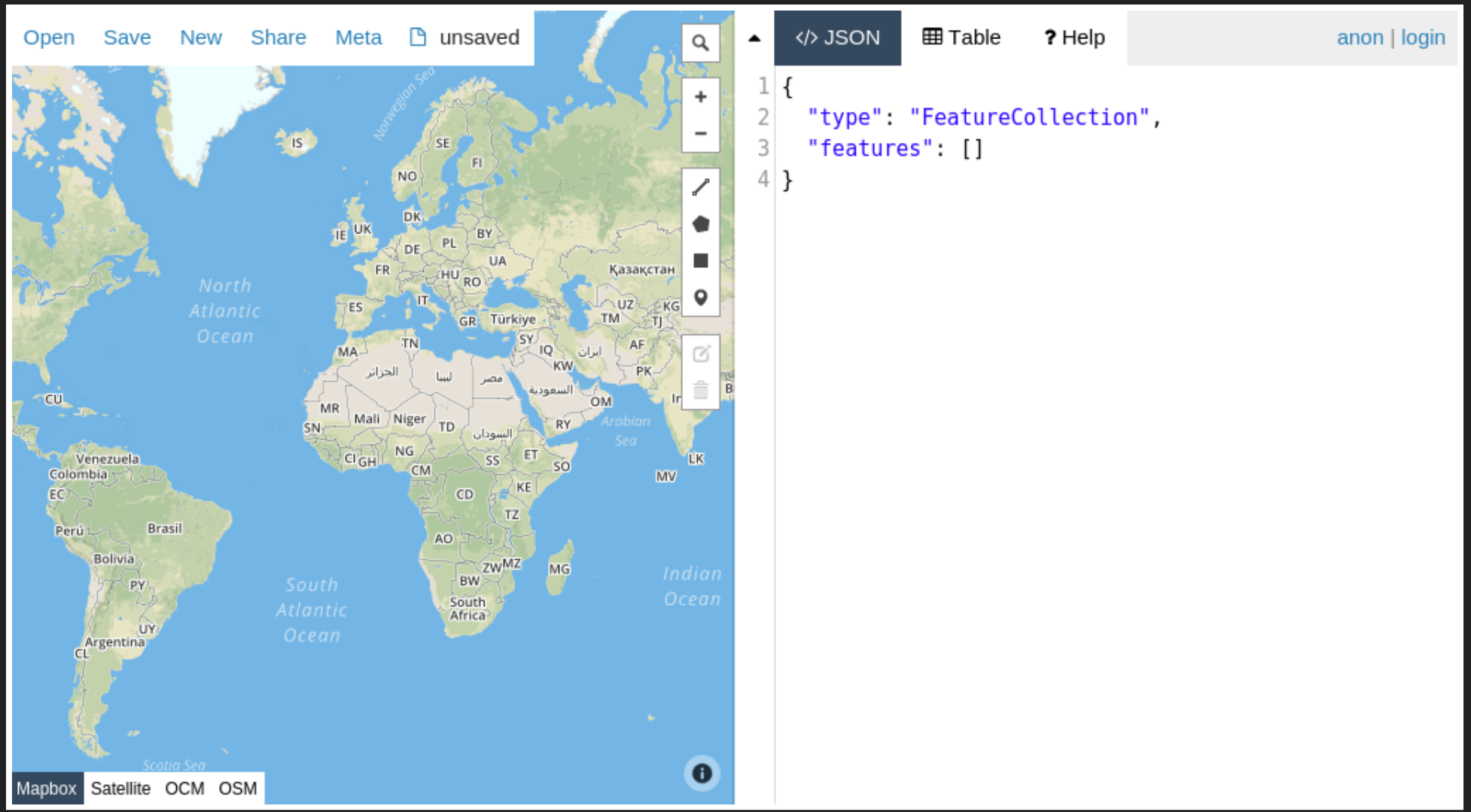
Jason Davies' Spherical Voronoi

https://www.jasondavies.com/maps/voronoi/



Download KML from SOS Locations

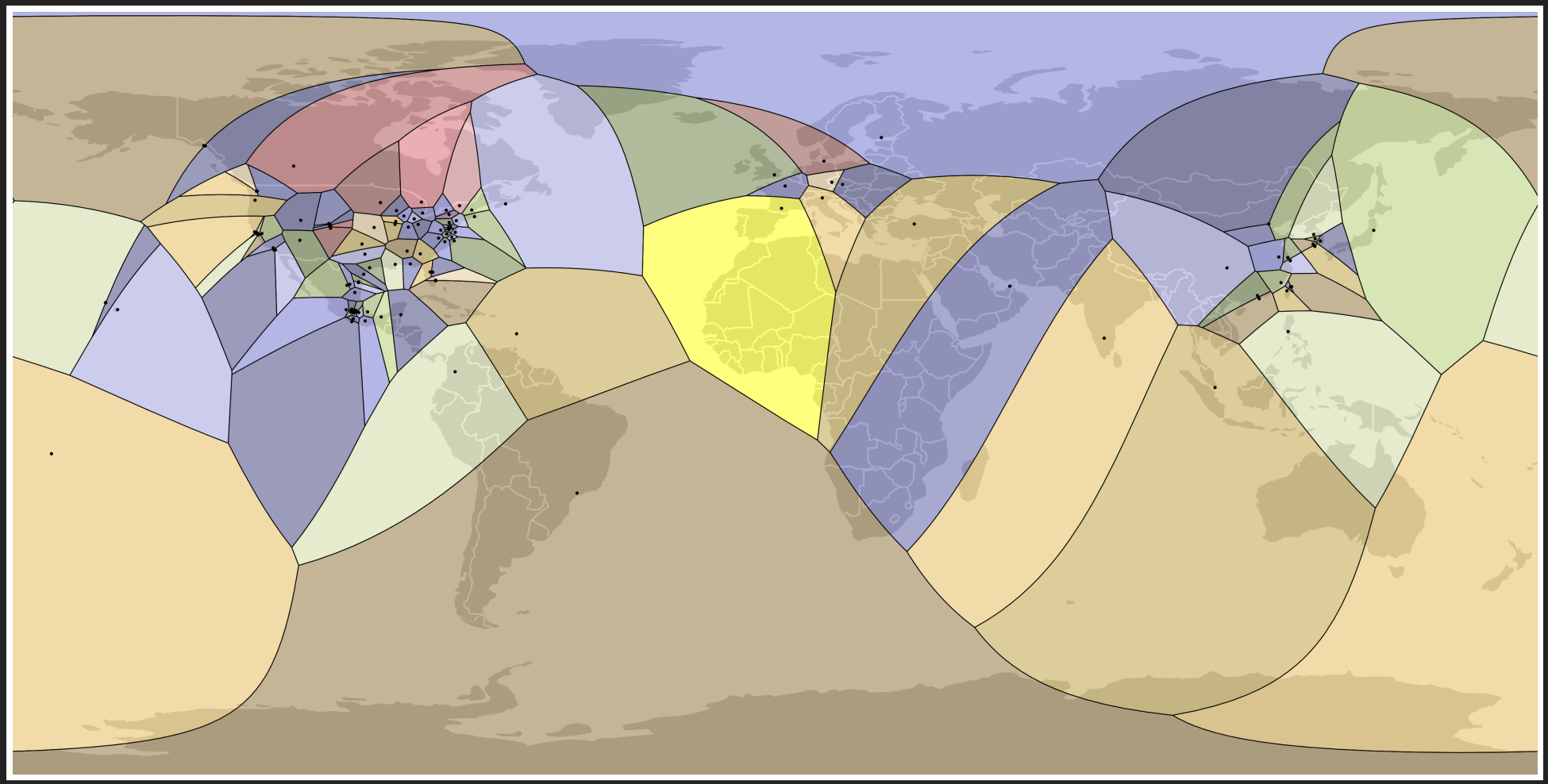
https://www.google.com/maps/d/embed?mid=zWIHp2z9bzho.kHZ71NU6mNt8



Convert to CSV using geojson.io

http://geojson.io/

1. Change spherical voronoi code to use equirectangular projection
2. Grab SVG with SVG Crowbar
3. Edit SVG with graphics editor



QUESTIONS?

FOR MORE INFO

http://avl.iu.edu

vishelp@iu.edu